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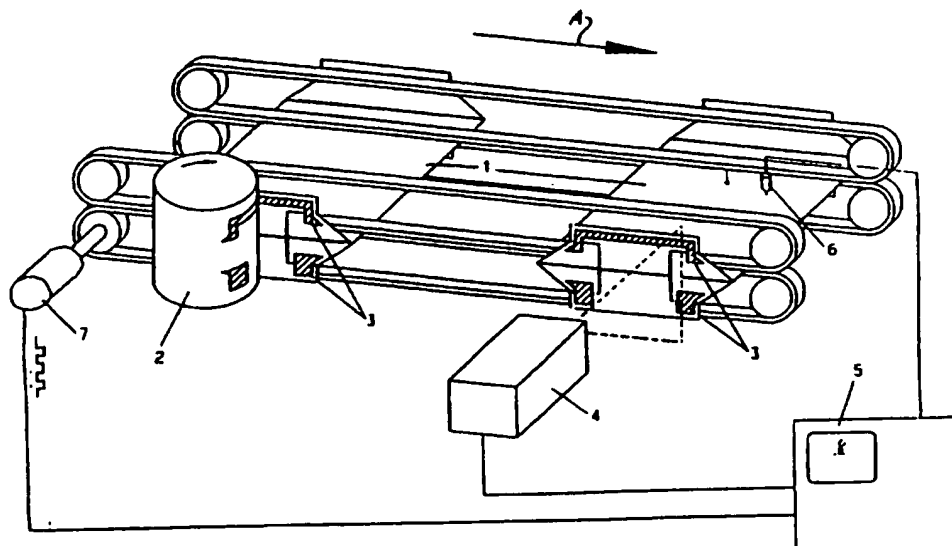
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(54) Abstract Title

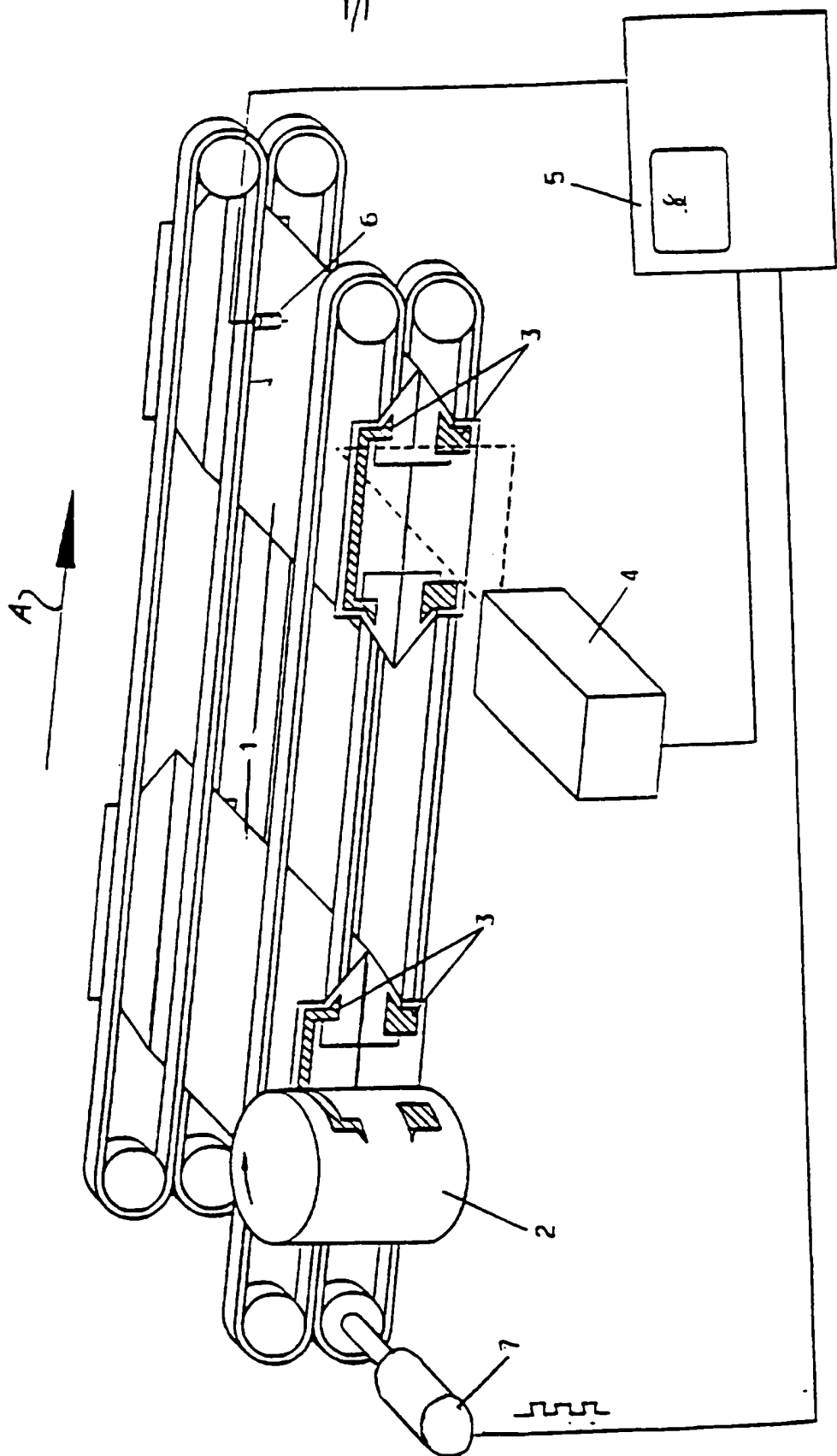
**Method for checking adhesive application in the manufacture of bags**

(57) In the manufacture of paper bags 1 a thermal imaging camera 4 is used to monitor the correct application of adhesive 3 to the bottoms of the bags. The adhesive is at a different temperature to the material of the bag and defective bags are detected by comparison with a reference image. The application of the adhesive can also be controlled.



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A METHOD FOR CHECKING THE DEPOSITS OF ADHESIVE ON THE  
OPEN BOTTOMS OF SACKS OR BAGS

5 The invention concerns a method for checking the deposits of adhesive on the bottoms of continuously conveyed sacks or bags in the manufacture of sacks or bags.

10 Sacks or bags are manufactured from laid flat tubular sections of paper, a plastic material or other suitable materials in that the ends of the tubular sections are opened out into so-called bottom squares when the corner folds and side folds or flaps are formed. In this process, the bag workpieces are during the bag manufacture continuously conveyed in a laid flat mode, with the opened out bottoms disposed at right angles to the laid flat transversely conveyed tubular sections. Before the bottoms are closed, the corner folds and side folds are provided with deposits which ensure leakproof bonding of the bottoms. Applications of adhesive are also required when the open bottoms are bonded together with so-called bottom cover leaves or valve inserts.

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25 The deposits of adhesive are applied to the open bottoms by being pressed by adhesive-applying rollers which take up the deposits from adhesive-applying devices and transfer the deposits of adhesive to the open bottoms in the correct format and position.

30 However, in applying the adhesive to the opened-out bottoms, defects may occur in that the adhesive in the adhesive-applying device is not replenished at the right time, so that the proper formatted application of the adhesive is impaired, resulting in rejects being produced. For this reason, the level of the adhesive in the application device is usually constantly monitored by means of optoelectronic scanners which, as the level of the ad-

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hesive drops, produce a signal which is used for actuating an adhesive feeder pump or a shutdown valve. Due to air bubbles in the adhesive supply, it is, for example, possible that soiling may occur resulting in a failure of the optoelectronic scanner.

The application of adhesives, in particular water soluble adhesives, to the opened-out bottom cannot be reliably detected because adhesives do not provide any usable signals.

Problems therefore do occur, in particular in applying water soluble adhesives which are however frequently desirable since they do not contain any noxious additives. Such water soluble adhesives are therefore used, in particular for bonding sacks or bags which are to be filled with food supplies.

It is, therefore, the object of the invention to create a method of the kind indicated in the opening passage above, which also allows reliable checking of the formatted deposits of adhesive on the opened-out bottoms when optoelectronic scanners fail.

In accordance with the invention, there is provided a method of checking the deposits of adhesive on the bottoms of continuously conveyed sacks or bags in the manufacture of sacks or bags, wherein, before or after being applied, deposited adhesive is brought to a temperature which is different from the temperature of the material of the bag or sack bottom; wherein the deposit pattern of the adhesive is scanned by a thermal-imaging camera; and wherein the signals of the thermal-imaging camera are processed by a computer and compared with a reference image.

With the method in accordance with the invention, conventional deposits of adhesive, and in particular the deposits of water soluble adhesives, can be checked in a simple manner using a thermal-imaging camera which reacts  
5 to the temperature of the adhesive. The adhesive to be applied can be brought in a simple manner to a temperature such that it can be reliably detected by the thermal-imaging camera. To generate images of the deposit pattern of the adhesive, the temperature of the applied adhesive  
10 must differ in such a clear-cut manner from the temperature of the carrier material that the thermal-imaging camera will react. If the temperature of the deposit of adhesive is higher than that of the carrier material, it is possible for example to generate a positive image of the deposit  
15 pattern of the adhesive. If the temperature of the deposit of adhesive is lower than the temperature of the carrier material, there are generated for example negative images of the deposit of adhesive which can also be reliably processed.

20 The image generated by the thermal-imaging camera can be displayed on a monitor. However, it is also possible to effect in the computer, by means of the signals generated by the thermal-imaging camera, a desired value/actual value  
25 comparison with stored signals which represent the correct deposit pattern of the adhesive.

Expediently, the thermal-imaging camera is triggered when the formatted deposit of adhesive to be checked is situated  
30 in its photographic field of view. In this way, a still image of all the bottoms with the deposits of adhesive to be checked can be generated on the monitor, so that the correct position of the formatted deposits of adhesive can be monitored in a simple manner and error can be easily  
35 corrected.

In a preferred embodiment, the deposit pattern of the adhesive may be scanned by the thermal-imaging camera in successive vertical columns. The image, generated linewise or columnwise in this way, is also displayed on a monitor  
5 as a still image.

An example of an embodiment of the invention will be explained in greater detail below with reference to the accompanying drawing in which the single Figure shows  
10 schematically in perspective, the adhesive-applying station with the thermal-imaging camera

In the drawing there may be seen a conveyor device for the workpieces 1, which consist of laid flat tubular sections.  
15 The device comprises two double-belt conveyors whose facing conveying sides lying on top of one another clamp the bag workpieces between them during their conveyance in the direction of arrow A. The end zones of the tubular sections project outwardly in each case beyond the  
20 conveyance belts. In the drawing, the conveyed workpieces 1 can be seen in a state where the bag end zones projecting beyond the double-belt conveyors have already been opened out, by conventional bottom opening devices, into open bottoms which are disposed at right angles to the flat  
25 central portions of the workpieces 1.

An adhesive-applying roller 2 contacts the passing bottoms in the way shown, and applies formatted deposits of adhesive 3 to the side folds and corner folds of the bag  
30 bottoms. These formatted deposits of adhesive are formed in such a way that the bag bottoms can be closed by folding-in the side folds overlapping one another and be bonded in a leakproof manner.

35 For monitoring the correct position of the formatted

deposits of adhesive 3 a thermal-imaging camera 4, controlled by a computer 5, is arranged in the machine, preferably adjustably mounted on the machine frame, downstream of the adhesive-applying roller in the convey-  
5     ance direction. For triggering the thermal-imaging camera 4, there is an optoelectronic detector 6 which detects the leading edge of the passing workpiece 1. After having been started, the thermal-imaging camera 4 scans the passing bag bottom and the formatted deposits of adhesive applied  
10    thereto in vertical scanning lines and in this process, on the basis of the signals of the thermal-imaging camera 4, the computer 5 generates on the monitor 8 a still image of the bag bottom, composed of the vertical scanning lines and of the formatted deposits of adhesive applied thereto.

15    An incremental speed sensor 7 is mounted on a guide roller of the double-belt conveyor. In this way, the computer 5 also receives signals for detecting the position of the workpieces 1 independently of their speed.

CLAIMS

1. A method of checking the deposits of adhesive on the bottoms of continuously conveyed sacks or bags in the manufacture of sacks or bags, wherein, before or after being applied, deposited adhesive is brought to a temperature which is different from the temperature of the material of the bag or sack bottom; wherein the deposit pattern of the adhesive is scanned by a thermal-imaging camera; and wherein the signals of the thermal-imaging camera are processed by a computer and compared with a reference image.
2. A method according to claim 1, wherein the comparison of the generated image with a reference image uses the step of displaying on a monitor the image generated by the computer.
3. A method according to claim 1 or 2, wherein the camera is triggered when the deposit of adhesive is situated in its field or view.
4. A method according to any one of claims 1 to 3, wherein the deposit pattern of the adhesive is scanned by the thermal-imaging camera in successive scan lines.
5. A method according to any one of claims 1 to 4, wherein the comparison of the generated image with a reference image comprises a comparison, by the computer, of the signals of the thermal-imaging camera with stored set point signals.
6. A method according to any one of claims 1 to 5, wherein, in the case of any deviations of the generated image from the reference image exceeding a tolerance limit,

a signal is generated for actuating a reject shunt to receive the defective workpiece.

- 5 7. A method of checking the deposits of adhesive on sack or bag bottoms, substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawing.



INVESTOR IN PEOPLE

Application No: GB 9824785.1  
Claims searched: 1 - 7

Examiner: Anna Mackisack  
Date of search: 17 February 1999

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK CI (Ed.Q): G1A (AAJF AAJP AMAB AMAX AMQH)  
Int CI (Ed.6): G01N 21/88 21/89 21/90; B31B 1/62 1/74 19/00 19/62  
Other: Online: WPI, JAPIO

### Documents considered to be relevant:

| Category | Identity of document and relevant passage                             | Relevant to claims |
|----------|---|--------------------|
| A        | GB 2133873 A SIG (SWITZERLAND) see especially page 1 lines 114 to 123 | 1, 6               |
| X        | EP 0624789 A1 OPTEX CO LTD see whole document                         | 1, 5               |
| A        | US 5375722 A LEARY et al  | 1, 6               |

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
& Member of the same patent family

A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.  
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